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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/662,384	09/16/2003	Mitsuaki Hori	031111	2168

38834 7590 11/18/2005

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EXAMINER
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SEFER, AHMED N

ART UNIT	PAPER NUMBER
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2826

DATE MAILED: 11/18/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

10/662,384

Applicant(s)

HORI ET AL.

Examiner

A. Sefer

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 28 September 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-14 is/are pending in the application.
- 4a) Of the above claim(s) 1-3 and 7-13 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 4-6 and 14 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## **DETAILED ACTION**

### ***Continued Examination Under 37 CFR 1.114***

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 9/28/05 has been entered.

### ***Claim Rejections - 35 USC § 103***

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 4-6 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Umeda in view of Wristers /Karasawa.

Umeda discloses in figs. 1-6 a method of manufacturing a semiconductor device, comprising steps of: forming a silicon oxynitride film 3b on a surface of a semiconductor substrate; forming a conductive film for a gate electrode on the silicon oxynitride film; patterning the conductive film to leave a gate electrode 4; and implanting impurities into semiconductor regions on both sides of the gate electrode to form source and drain regions, wherein in the step of forming the silicon oxynitride film, the silicon oxynitride film is formed wherein three bonds

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of each subject nitrogen atom are all coupled to silicon atoms, but does not disclose remaining three bonds of each of three silicon atoms connected to the subject nitrogen atom all being coupled to other nitrogen atoms.

Wristers discloses (col. 8, lines 54-67 and col. 9, 1-8) a method of manufacturing a semiconductor device, comprising steps of: forming a silicon oxynitride film 20/28 on a surface of a semiconductor substrate; forming a conductive film for a gate electrode 24 on the silicon oxynitride film; patterning the conductive film to leave a gate electrode 26; and bonds of silicon atoms connected to a subject nitrogen atom coupled to other nitrogen atoms 48.

Similarly, Karasawa discloses in fig. 1 a method of manufacturing a semiconductor device, comprising steps of: forming a silicon oxynitride film 2 on a surface of a semiconductor substrate; forming a conductive film for a gate electrode 4 on the silicon oxynitride film; patterning the conductive film to leave a gate electrode; and bonds of silicon atoms connected to a subject nitrogen atom coupled to other nitrogen atoms 3.

Since Umeda and Wristers/ Karasawa are all from the same field of endeavor, fabrication of metal oxide semiconductor devices using silicon oxynitride film, the teaching disclosed by Wristers/ Karasawa would have been recognized in the pertinent art of Umeda. Therefore, it would have been obvious to one skilled in the art at the time the invention was made to modify Umeda's device by incorporating bonds of silicon atoms in a bulk of oxynitride layer connected to a subject nitrogen atoms coupled to other nitrogen atoms so as to block boron atoms as taught by Wristers/ Karasawa.

As to an existence ratio of subject nitrogen atoms to a total number of nitrogen atoms in the silicon oxynitride film becomes 20% or smaller/greater than 0% or a thickness of 3nm or

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less, the specification contains no disclosure of either the critical nature of the claimed arrangement or any unexpected results arising therefrom. Where patentability is said to be based upon particular chosen dimensions or upon another variable recited in a claim, the applicant must show that the chosen dimensions are critical. In re Woodruff, 919 F.2d 1575, 1578, 16 USPQ2d 1934, 1936 (Fed. Cir. 1990).

As for claim 5, Wristers/ Karasawa discloses (col. 3, lines 21-50) a step of forming the silicon oxynitride film comprises steps of: forming a silicon oxide film on the surface of the semiconductor substrate; and nitriding the silicon oxide film.

As for claim 6, Wristers discloses (col. 3, lines 52-65 and col. 4, lines 11-26) the step of forming the silicon oxynitride film comprises steps of: forming a silicon nitride film on the surface of the semiconductor substrate; and oxidizing the silicon nitride film.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to A. Sefer whose telephone number is (571) 272-1921.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nathan Flynn can be reached on (571) 272-1915.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

ANS  
November 13, 2005

NATHAN J. FLYNN  
SUPERVISOR  
TECHNICAL EXAMINER  
2000